

AMENDMENTS TO THE CLAIMS

Claim 28. (Cancelled)

Claim 29. (Cancelled)

Claim 30. (Cancelled)

Claim 31. (Cancelled)

Claim 32. (Cancelled)

Claim 33. (Cancelled)

Claim 34. (Cancelled)

Claim 35. (Cancelled)

36. (Currently Amended) An apparatus for electrical detection of molecular interactions between an immobilized oligonucleotide probe and a target nucleic acid molecule, ~~said apparatus comprising a supporting substrate comprising:~~

a) a supporting substrate comprising a plurality of microelectrodes each comprising a conjugated polymer and ~~an~~ a different immobilized oligonucleotide probe attached to said conjugated polymer;

b) a voltage source connected to said microelectrodes;

c) an electrolyte solution comprising ~~a solution of~~ Li⁺ ions, wherein said solution is in contact with said microelectrodes; and

d) a detector connected to said microelectrodes.

Claim 37. (Cancelled)

38. (Currently Amended) ~~The~~ An apparatus according to claim 36, ~~wherein said apparatus further comprising~~ comprises a counter-electrode.

39. (Currently Amended) ~~The~~An apparatus according to claim 36, ~~wherein said apparatus~~ further ~~comprising~~comprises a reference electrode.
40. (Currently Amended) ~~The~~An apparatus according to claim 36, wherein said detector ~~will detect changes in~~ is an impedance ~~dectector~~dectector ~~at each microelectrode~~.
41. (Currently Amended) ~~The~~An apparatus according to claim 36, wherein said solution of ~~Li⁺ ions~~ comprises ~~a solution of~~ LiClO₄.
42. (Currently Amended) ~~The~~An apparatus according to claim 41, wherein the ~~concentration of said solution of~~ LiClO₄ is about 0.1 M.
43. (Currently Amended) ~~The~~An apparatus according to Claims 36, wherein ~~said the~~ microelectrodes comprise a conductive material and an insulating material.
44. (Currently Amended) ~~The~~An apparatus according to Claim 43, wherein ~~said the~~ conductive material is solid or porous gold, silver, platinum, titanium, copper, metal oxide, metal nitride, metal carbide, or graphite carbon.
45. (Currently Amended) ~~The~~An apparatus according to Claim 44, wherein ~~said the~~ conductive material is platinum.
46. (Currently Amended) ~~The~~An apparatus according to Claim 44, wherein ~~said the~~ conductive material is gold.
47. (Currently Amended) ~~The~~An apparatus according to Claim 43, wherein ~~said the~~ insulating material is glass, silicon, plastic, rubber, fabric, ceramic or a combination thereof.

48. (Currently Amended) ~~The~~An apparatus according to Claim 47, wherein ~~said~~the insulating material is silicon.
49. (Currently Amended) ~~The~~An apparatus according to Claim 47, wherein ~~said~~the insulating material is glass.
50. (Currently Amended) ~~The~~An apparatus according to Claim 43, wherein ~~said~~the conductive material is embedded in ~~said~~the substrate and ~~said~~the substrate comprises ~~said~~the insulating material.
51. (Currently Amended) ~~The~~An apparatus according to Claim 43, wherein ~~said~~the conductive material is silver/silver chloride.
52. (Currently Amended) ~~The~~An apparatus of Claims 36, wherein ~~said~~the supporting substrate comprises ceramic, glass, silicon, fabric or plastic.
53. (Currently Amended) ~~The~~An apparatus of Claim 36, wherein said conjugated polymer is selected from the group consisting of polypyrrole, polythiophene, polyaniline, polyfuran, polypyridine, polycarbazole, polyphenylene, poly(phenylenvinylene), polyfluorene, polyindole, their derivatives, their copolymers and ~~their~~ combinations thereof.
54. (Currently Amended) ~~The~~An apparatus of Claims 36, wherein ~~said~~ probes are ~~immobilized by attached to microelectrodes using~~ a neutral pyrrole matrix.
55. (Cancelled)